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IEEE Engineering in Medicine and Biology Society Student Chapter at UFABC: student opportunities and contributions

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Background, Motivation and Objective. Biomedical engineers, along with physicians, have made numerous advances on the quality of life of the population such as improvements in drugs, medical equipment and development of complex systems. Within the challenges for the coming decades, the training of new professionals and multidisciplinary collaborations were highlighted as one of the important key actions for the future according to a consensus study organized by societies related to the biomedical engineering field. Thereby, highly-qualified biomedical engineers need, besides solid background on both engineering and biological fields, develop a set of skills required to attend the increasing demands of the academic and industrial sectors, such as communication level, time management, emotional intelligence, proactivity and ability to work in groups. On this scenario, student associations such as IEEE chapters have been shown to play an active role improving students performance regarding such skills. This work aims to show the actions of Engineering in Medicine and Biology Society (EMBS) student chapter from the Federal ABC University (UFABC).

Methods. EMBS UFABC actions are divided in three main guidelines: technical projects development, partnerships with companies, and academic and scientific communication. Technical projects: the projects are suggested by members or by the undergrad students. It is followed by an detailed analysis of the resources needed (level of technical knowledge needed, number of work hours, cost, number of members interested, social impact, opportunity of learning, and impact on ongoing projects). Based on these factors, the projects are ranked and then a work-group is created, with up to two students as coordinators and the remaining members are enrolled according to their affinity. Projects development are evaluated by the director board of EMBS UFABC by weekly reports and submitted to the main IEEE organization office in USA. Partnerships with companies: are mainly focused on internship programs, but some have evolved to academic exchange and research partnerships. It allows early career experience to the undergraduate students. Lastly, the academic communication aims to disseminate the biomedical engineering field and its areas of expertise to the current and future biomedical engineering students at UFABC. This knowledge might help students latter at selection of lectures and courses according of their interest. For current students, EMBS ministrates courses and workshops focused on their main interests. Their requests are gathered through online surveys and the entity plans workshops and trainings by contacting partner companies that are willing to share their time and expertise, and ministrating courses and technical activities. The contact with future students is managed by the EMBS UFABC education nucleus, which involves 10 students. The main objective is to visit high school students to explain about biomedical engineering area, market possibilities, and future tendencies.

Results. EMBS-UFABC was founded in 2013 and it is currently composed by 31 students, 17 males and 14 females working 5.07 ± 2.74 hours per week, and a biomedical engineering lecturer



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counselor/tutor. All members are enrolled on at least one activity, project, and/or assuming administrative functions (president, vice president, secretary, treasurer, marketing manager, and project coordinator). Technical projects: currently the EMBS-UFABC chapter runs 3 projects (see Table 1). “HandsOn” is a social project focused on 3D print hand prosthesis for donation to underprivileged children. “Analysis of rate of prosthesis abandonment” aims to apply surveys to patients in order to understand how prosthesis abandonment works in Brazil. FlexSensor is a practical project where the goal is to develop a mechanical arm controlled by a glove. Partnerships with companies: in collaboration with the UFABC Biomedical Engineering course, a partnership between State Hospital Mário Covas and UFABC is under development to hire two opportunities for students at the clinical engineer sector. It will then continue at a continuous flow in order to make possible practical experience on the routine and abilities of this area. Moreover, a partnership with T4K physiotherapy center focuses, besides an internship program, on research affiliation with the university and academic improvement, where the center allows free entry on their paid courses for EMBS-UFABC members.

Table 1: Ongoing EMBS-UFABC projects.

Project	Number of participants
HandsOn	10
Analysis of rate of prosthesis abandonment	8
FlexSensor	13

Academic communication: During the first semester of 2018, two workshops and a lecture were organized on the fields of prosthesis construction and 3D scanning. For the second semester, the main event planned is the “week of engineers”, which involves the university as a whole, including other courses than biomedical engineering. The goal of this event is to contact highly qualified professionals in order to enhance knowledge and promote contact with several areas according to the students suggestions. EMBS-UFABC is participating on the organization of this event, in collaboration with the coordinators of biomedical engineering course by surveying the interests of students and contacting experts on the field of biomedical engineering.

Discussion and Conclusions. The actions developed by the EMBS IEEE showed improving students background, abilities and prepare them to meet the increasing demands from the academic and industry biomedical engineering sector. Moreover, it also contribute with the overall development of undergraduate students from the course and the high school students on the awareness with the field possibilities of studying biomedical engineering. Finally, the integration between students and lecturers from the UFABC biomedical engineering undergraduate course might have a positive impact contributing for the enhancement of both students and course.

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Keywords. Biomedical engineering; competencies; enhancement; student associations; soft skill; networking.